



Activity Deliverable

20036 S.M.U.D.

DEL04 Handbook on the business models

EIT Urban Mobility - Mobility for more liveable urban spaces

EIT Urban Mobility

Barcelona, Spain | 30.07.2020



EIT Urban Mobility is supported by the EIT,
a body of the European Union

eiturbanmobility.eu

Reporting year	2020
Activity code	20036
Deliverable No.	DEL04
Deliverable title	Handbook on the business models

Document information

Author(s) and contributing partner(s)

Name	Organisation	Contribution
Eglantina Dani	043_1 CIMNE	Deliverable
Francesc Gasparin	043_1 CIMNE	Deliverable

List of abbreviations (if any)

MD	Micro Depots
LSPs	Logistic Service Providers
SWOT	Strengths, Weaknesses, Opportunities and Threats

Contents

1. Executive Summary	1
2. Business model picture.....	2
2.1. Relevant details to consider.....	2
2.2. Business model canvas	4
3. Helsinki.....	8
3.1. Customer Interface.....	8
3.2. Product	9
3.3. Infrastructure Management	10
3.4. Financial Aspects	11
4. Helmond	13
5. SWOT analysis	14
6. References	16
7. Acknowledgements	17

1. Executive Summary

The term business model is an explanation of how companies/organizations create, deliver and capture value in economic, social and cultural contexts in order to provide this value to their customers at an appropriate cost. Business models use tools that allow the business owner to experiment, test, and model different ways of structuring their costs, and revenue streams.

The current handbook focuses on two main points:

1. Relevant details to consider and structure of the business model tailored to shared micro depots
2. Main considerations of the business models in the two pilot cases developed in the framework of the S.M.U.D. project.

The most important aspects considered for the creation of a high-quality business model are:

- Relevant needs
- Requirements
- Limitations
- Regulations

Moreover, the business model canvas is explained as it helps understand the business model in a straightforward, structured way. Understanding and using the business model canvas leads to insights about the customers, the product offered and through what channels, the infrastructure management as well as the financial aspects of the model.

Finally, a description of the main aspects of the business model of the testbed launched in Helsinki is presented in the current deliverable, taking into account the answers provided by the interviews with FVH and different LSPs.

2. Business model picture

The term business model is used to describe a range of formal and informal representations of important aspects of the business itself. It is an explanation of how companies/organizations create, deliver and capture value in economic, social and cultural contexts in order to provide this value to their customers at an appropriate cost.

Business models use tools that allow the business owner to experiment, test, and model different ways of structuring their costs, and revenue streams.

With regards to the shared micro depots in the framework of S.M.U.D., this chapter focuses on two points: relevant details to consider and structure of the business model.

During the first part, the important aspects for creating a high-quality business model are explained. These aspects are:

- Relevant needs
- Requirements
- Limitations
- Regulations

The second part describes the business model canvas, which is used to help understand the business model in a straightforward, structured way. Using the business model canvas leads to insights about the customers, the value propositions offered and through what channels, as well as how the model creates revenues.

2.1. Relevant details to consider

To carry out a good business model, four relevant aspects must first be considered (in this case). These aspects are:

1. Needs

- Several decentralized locations, instead of one central micro-depot: A holistic logistics concept is needed for the entire city, which includes several micro-depots following a honeycomb pattern.

- Qualified planning personnel with local detailed knowledge: Logistics companies need a qualified contact person on site who supports them in setting up operating and development structures and contributes detailed local knowledge.
- Availability of real estates and properties that meet the requirements and are suitable for logistics processes.
- Operating procedures: additional handling and transshipment processes necessary.

2. Requirements

- Consignment and customer structure: small and medium sized consignments (e.g. parcels in size classes S and M) and high spatial density consignee distribution with low drop-factors.
- Service area: approximately two to three kilometres radius from the micro-depots with a height profile without significant gradient or slope.
- Infrastructure: availability of (inexpensive) properties in urban areas with enough space for shunting and parking last mile delivery vehicles. The properties should be equipped with charging infrastructure and must be able to be supplied by trucks.
- Local Support: The efforts of Logistics Service Providers (LSPs) must be supported by a last-mile project coordinator (local authorities).
- The operating model is of permanent use, with multi users.
- The technical implementation can be mobile or immobile, with flexible storage systems.
- Based on the assumption that the bicycle lanes network should ensure the reliability of winter maintenance, good lightning and good state of the pavement, safety rules to ensure desirable working conditions for employees' endeavour need to be satisfied as the traffic congestion might affect cargo bikes distribution services.

3. Limitations

- The administrative way to manage the service, making the business model financially sustainable and also the rapid changes that the urban logistics sector is facing.
- The lack of need for these services if logistic companies find financially sustainable ways to develop their own sustainable delivery system and the distortion in market competition that could be created when public space is given to one company instead of another.
- Weather harshness is a drawback in the use of bicycles as transport alternative during winter seasons.
- Business model: Typically, urban areas have high rents and a conflict of use with other active businesses in the same area. Furthermore, there is a trade off between urban environmental objectives and urban subsidies for micro-depots to ensure that the demand of the population is satisfied.

- Legal and administrative: Requirements may differ from cities or municipalities so there is no common legal basis for scaling the business model.
- Acceptance of cargo bikes and small vehicles in public spaces: cargo bikes and small vehicles participate in public road traffic and can impair processes on roads, cycle paths or sidewalks.

4. Regulations

Bicycles and cycle logistics have established themselves in the public discourse on the design of urban transport and urban logistics. However, the specific knowledge about the diversity, functions and special features of cycle logistics with a focus on the last/first mile is still limited. There are different pilot projects in the European cities, which show that cycle logistics concepts can be successfully implemented, but so far, there is a lack of generalized planning knowledge that allows the establishment and scaling of cycle logistics systems beyond the pilot status.

Currently, there is a lack of tools for urban planners. Each city relies on regulations and regulatory trends that influence the business model in different ways.

2.2. Business model canvas

The business model canvas helps organizations/companies conduct structured, tangible, and strategic conversations around businesses as well as manage strategies. The canvas's main objective is to help towards business model thinking.

The Business Model Canvas (BMC) is a tool used to visualize all the building blocks of a business, including customers, route to market, value proposition and finance.

The four big blocks of the BMC (Table 1) are:

Customer Interface

The customer interface takes into account customer segments, customer relations and channel.

- Customer segments: defines the groups of people or organizations a business seeks to reach and serve.
- Customer relations: attachments which should be established with different customers.
- Channels: how customer relations should be established.

Product

The product bloc considers value propositions and externalities.

- Value propositions: the product dimension refers to the value proposition that the business model offers for the customer. Central issues are what specific value to deliver to different customer segments, and what problems the particular product or service is solving for the customer.
- Externalities: this dimension also includes benefits that fall on actors who did not choose to incur that cost or benefit.

Infrastructure Management

The infrastructure management block takes into account key partners, key activities and key resources.

- Key partners: this dimension also includes the total network of suppliers and partners that secure the functioning of the business model.
- Key activities: describes the activities that take place to generate the value proposition. Activities could be compared to business processes, and can be found in production, sales, deliveries, service, and support.
- Key resources: It further includes the most important resources required for the functioning of the business model. These can be physical, financial, intellectual, and human.

Financial Aspects:

Cost structures, results and revenue streams are part of the financial aspects block.

- Cost structures: it further describes expenses related to activities, resources, and partners in the business model.
- Results: refer to environmental, social, and economic aspects.
- Revenue streams: refers to how the business model generates a turnover from the value proposition. In many cases, different revenue models are appropriate for different customer segments.

3. Infrastructure Management		2. Product		1. Customer Interface	
Key Partners <ul style="list-style-type: none"> Public authorities Logistic service providers Carriers Vehicle manufacturers Electric companies Property owners 	Key Activities <ul style="list-style-type: none"> Reception Consolidation Storage Distribution Tracking Delivery/ pick-up notice Service provision UCC operation Marketing, networking 	Value Propositions <ul style="list-style-type: none"> Advertising space Accessibility to urban space Efficient, consolidated delivery Vehicle rental Reliable, flexible services Storage Other value-added services 	Customer Relations <ul style="list-style-type: none"> Personal delivery Customer service Self-service Direct advert marketing 	Customer Segments <ul style="list-style-type: none"> End-receivers Shippers Carriers Manufacturers The City Property owners 	
	Key Resources <ul style="list-style-type: none"> Vehicles Equipment Local enthusiast Personnel Building, infrastructure Access to city centre 	Externalities <ul style="list-style-type: none"> Reduced mileage Reduce fuel consumption Reduced emissions Reduce travel time Improved traffic safety Attractive city 	Channels <ul style="list-style-type: none"> Publicity Personal relations Existing business relations ICT system Social media Web pages Urban deliveries 		
4. Financial Aspects					

Cost Structure	Result	Revenue Streams
<p>Investments</p> <ul style="list-style-type: none"> ● Premises (location, insurance) ● Maintenance ● Vehicles ● Infrastructures arrival cargo bike ● Equipment ● Training <p>Operating Costs</p> <ul style="list-style-type: none"> ● Personnel (wages) ● Rent and electricity ● Security services ● Insurance ● Uniform 	<ul style="list-style-type: none"> ● Economic ● Environmental ● Social sustainability 	<ul style="list-style-type: none"> ● Advertising space ● (Customized) distribution fees ● Added value services ● Public subsidies/ industrial support ● Subscription fees end-receivers ● Services fees: storage and other services

Table 1: Structure business model canvas (source: Bakás et al. 2017¹)

¹ https://www.researchgate.net/publication/319953901_Viable_solutions_for_green_urban_freight_a_business_model_for_consolidation

3. Helsinki

Before the Corona outbreak, pre evaluation meetings were held in Helsinki with the objective to present the S.M.U.D. project and find interested business partners. COVID19 affected some of the potential business partners which were unable to join the project.

The business partners that joined the project participated in an online workshop where it was agreed to test various operational processes and technical solutions in a real-life environment. As a result, the testbed of Helsinki was launched on the 9th of June 2020.

For the purpose of this deliverable, different online meetings were held with Forum Virum Helsinki in order to get as much information as possible regarding the business model of the Helsinki testbed. Moreover, two online meeting were also held with the operators DB Schenker and Neste. The information gathered during those meetings is summarized in this chapter.

3.1. Customer Interface

Customer Relations

The section describes the types of relationships a established with specific customer segments. The type of relationship that needs to be established with each customer segment should be clarified. Relationships can range from personal to automated. Thus the types of deliveries encountered are:

- Personal delivery
- Available customer service
- Self-service (depending on whether we will have a smart point of not)

Customer Segments

The section defines the different groups of people or organizations that the business model will reach and serve. The different groups or segments that are involved in the deliveries are the following:

- End-receivers
- Shippers
- Carriers

- Manufacturers
- The City
- Property owners

Channels

The main channels to attract customers who use the micro-depot are the location and the characteristics of the facility, such as capacity, unloading area, space for docking, etc. The key is to have the micro-depot in the city centre, as is the case in the city of Helsinki, as it is an area with access restrictions, which make it difficult to carry out certain operations. The advantage of the location of the shared micro depot in Helsinki is that there is a bike lane to use and access the city centre without problems.

3.2. Product

Value Propositions

The product value proposition is surely one of the keys to the business model to attract new customers because of the need to offer something special or unique that other competitors do not have.

In relation to the Helsinki pilot, some of the features are indicated below:

- The possibility of sharing a van/truck to serve multiple hubs/micro depots is taken into account. Moreover, deliveries are carried out the day after the pick-up.
- Optimization is performed whenever possible, although there is the possibility of unexpected events.
- When possible, the trucks make only one stop to the micro depot. However, the number of trucks can be minimized if they can make multiple stops at different micro depots.
- The delivery planning is carried out taking into account different micro depots. After scheduling the full loads of one truck on one micro depot, the truck delivers to the micro depot and then proceeds to the next. The process continues until all deliveries are carried out. Note that when each micro depot needs at least one full truck load, each of the trucks will make a maximum of two stops.

Externalities

In order to calculate the externalities, information obtained during the experience of the pilot test is needed and it is not possible to know a priori. Some of the data needed to perform the calculations are:

- The routes of the delivery vans before the pilot and the routes of the cargo bikes. A comparison between the vehicles can be carried out which in order to calculate the reduction of congestion in the area.
- Information on the number of accidents related to deliveries before and after implementation.
- Emissions of the vehicles used for the deliveries.

3.3. Infrastructure Management

Key Partners

Partnerships are the cornerstone of many business models. Alliances between the different companies are used to optimize their business models, reduce risks as well as acquire resources.

In the pilot case of Helsinki, the local administration and Logistic Service Providers (LSPs) cooperate to carry out its implementation.

The vehicles used by the LSPs to the shared micro depot are trucks or vans depending on the daily volume. It is important to take into consideration that pickups are carried out as well; therefore, the vehicles cannot be used at full capacity.

The vehicles used from the shared micro depot (MD) to the customer are mostly cargo bikes but electric vans can be used as well. Cargo bikes have a capacity of 1 m³, carrying out 30 to 40 shipments. The vehicles are stored overnight in the garage and loaded in the morning. For the pilot case of Helsinki, the cargo bikes are property of the LSPs.

Key Activities

This section describes the most important things companies must do to make their business model work. Every business model has a number of Key Activities. These are the most important actions to take in order to operate successfully.

The number of trips carried out by each LSP to the shared micro depot is 1 or 2 per day, as currently each LSP uses their own vehicle. Whereas, for the trips carried out from the shared micro depot to the customer, the number of vehicles depends on the type of vehicles used: 1 trip for vans and trucks and 3 – 4 trips for cargo bikes.

Expectations during the pilot:

- Some of the customers will be using the smart point.
- Cargo bikes and/or electric minivans will be used for the last mile delivery

- The LSPs will try to cooperate and share the vehicles where possible.
- The quantity of orders processed in a day depends on the demand. However, it is expected to be around 200 per day.
- The time window for the deliveries/pick up will be from 8:00 AM to 4:00 PM. Typically, the goods are delivered in the morning and pick-ups are carried out in the afternoon.

Key Resources

This section describes the most important assets required to make the business model work. Every business model requires key resources, which allow for the creation of a Value Proposition, reach markets, maintain relationships with Customer Segments, and earn revenues.

The main facilities needed for the shared micro depot:

- Unloading space for trucks/vans
- A small warehousing space
- Space destined for the cargo bikes

Moreover, the usage of a parcel locker (smart point) is part of the pilot case, however it will be used on a second stage. The first stage consists on using cargo bikes. The return option is also taken into account, by using the smart point or through the scheduling of a collection.

3.4. Financial Aspects

Cost Structure

The section describes all costs incurred to operate a business model. This building block describes the most important costs incurred while operating under the business model. Creating and delivering value, maintaining Customer Relationships, and generating revenue incur costs.

Investments

The main investments made for the shared micro depot are:

- Investment on cargo bikes
- Investment on the space reserved for the cargo bikes
- Installation costs for the smart point

Operating Costs

These types of costs are less relevant during this pilot case, because the micro depot is a test, which will help decide if the measure is economically sustainable and the LSPs are not paying the micro depot.

Revenue Streams

The section represents quantity generated from each customer segment (costs must be subtracted from revenues to create earnings). The main question is: what value is each Customer Segment truly willing to pay? Successfully answering that question allows the generation of one or more revenue streams from each customer segment.

4. Helmond

The initial plan was to organize onsite workshops with the business partners for the initiation of the dialogue. However, due to the Corona outbreak onsite gatherings in the Netherlands were banned from the 12th of March 2020 onward and an online session was organized instead.

The following categories of business partners were considered for the online session:

- Shipper of goods
- Receiver of goods
- Logistics service providers
- Providers of additional services at S.M.U.D. location

According to the participants the opportunities that a shared micro depot offers are:

- 24h accessibility for citizens and business partners
- Environmental and social impact
- Financial savings for shipment companies

Whereas the challenges that a shared micro depot could face are:

- Legal aspects
- Competition between logistics companies
- Operating model

However, since the testbed of Helmond has not been launched yet, its business model will not be described in this deliverable.

5. SWOT analysis

The SWOT analysis identifies and assesses the internal and external factors involved in the business models (see Figure 1).

All business models propose a value proposition represented by time sensitive delivery. Therefore, the big international companies entrust the last mile activities to traditional and/or green subcontractor carriers, in order to achieve operational and economic efficiency, as well as customer proximity.

The SWOT analysis and the Business Model Canvas show that, for a green model such as the S.M.U.D. business model, factors such as traffic and congestion, Low Traffic zones (LTZ) and the lack of parking areas for couriers with conventional vehicles could be considered strength points, due to the fact that it does not influence our model but rather it encourages it.

The S.M.U.D. model uses green vehicles such as bikes, in last-mile parcel deliveries, allowing them to earn additional income from the emissions reduction and carbon credit trading.

Moreover, the S.M.U.D business model is in line with the objectives set by the European Union in terms of improving the levels of sustainability in the cities, thus a wide range of ICTs as well as Operational Research methods are available for these types of models.

However, the operational model is affected by capacity constraints of bikes, which bind the size of parcels that can be loaded, thus representing the major limitation of this model. This constraint can be partially overcome using next-generation cargo bikes, which have a capacity of 100–150 kg per bike.

Moreover, the SWOT analysis highlights a threat related to the competition between traditional and green business models. In the S.M.U.D. the biker performance is subjected to physical fatigue, unlike the conventional models.

Price wars might arise if the competition is based exclusively on costs between conventional and green business model operating in the same geographical are. This might reduce their profitability or their differentiation in terms of service quality perceived by the final customer.

Concerning funding, the cost of construction and operation of MDs and purchasing or updating equipment and infrastructure makes it challenging to participate or pay for carriers and citizens. Public subsidizing might be a step towards resolving these issues but even national governments should be convinced on the effectiveness of fostering such initiatives. However, a potential lack of enforcement or regulations for vehicles may constrict the establishment of MD schemes.

Another threat that may arise is that MDs are not always the best solution. When serving large cities, it may not meet its demand levels. An erroneous placement of the MD may cause the opposite results than the expected ones, by increasing costs of transportation.

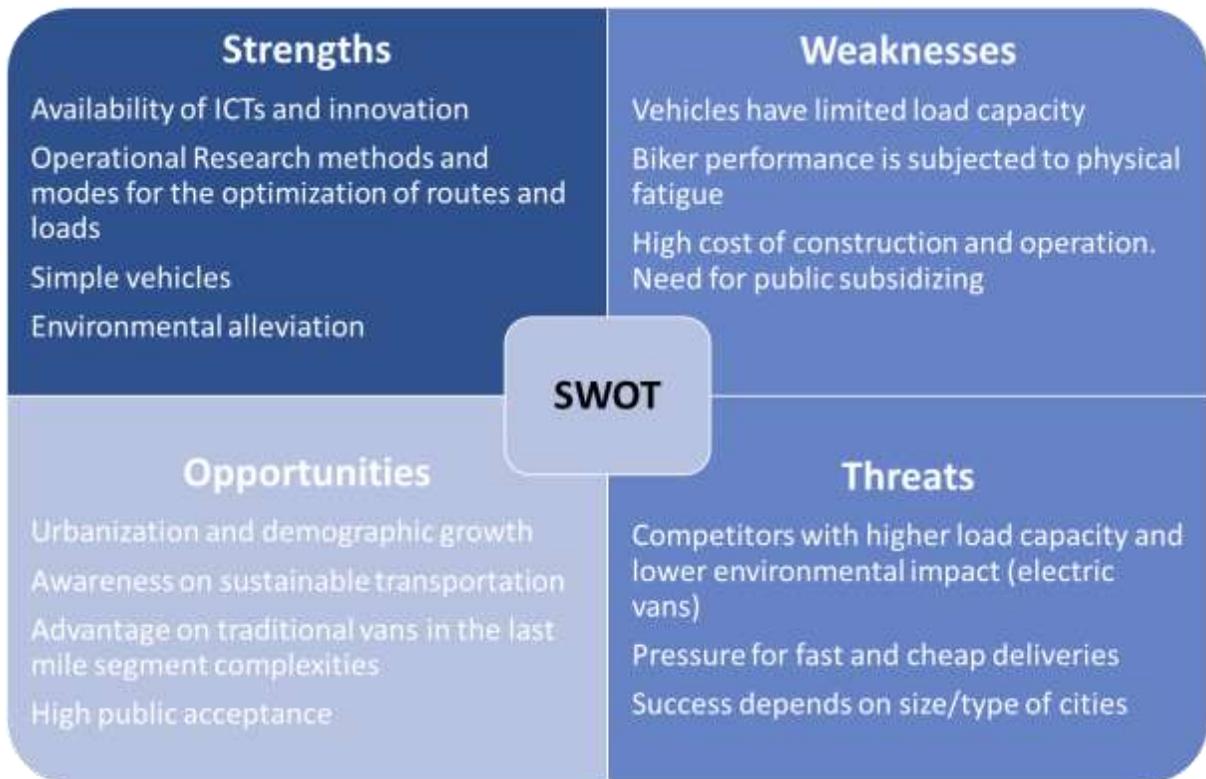


Figure 1: SWOT analysis for the S.M.U.D. business model (source: CIMNE elaboration)

6. References

1. Viable solutions for green urban freight: a business model for consolidation, Ottar Bakås, Kristin Ystmark Bjerkan, Marianne Elvsaa Nordtømme, Astrid Bjørgen Sund
2. Business Model Generation, Alexander Osterwalder & Yves Pigneur
(https://tudelft.openresearch.net/image/2015/10/28/business_model_generation.pdf)
3. A Managerial Analysis of Urban Parcel Delivery: A Lean Business Approach, Luce Brotcorne , Guido Perboli, Mariangela Rosano, and Qu Wei
4. S.M.U.D. Report on stakeholder workshops (DEL05)
5. Planning Of Cargo Bike Hubs, A guide for municipalities and industry for the planning of transshipment hubs for new urban logistics concepts
6. Urban distribution concepts: a SWOT analysis on best practices of urban logistics solutions, Konstantinos Papoutsis, Michael Gogas and Eftihia Nathanail

7. Acknowledgements

The present deliverable is based on the research and work that has been conducted in the framework of the S.M.U.D. project. An important part of the deliverable is based on the interviews with Forum Virum Helsinki and Logistics service providers in Helsinki (DB Schenker, Nest as well as Brainport Smart District, carried out in cooperation with Technion – Israel Institute of Technology.